

**WHAT IS CLAIMED IS:**

1. A method for removing mercury from a fluid stream, comprising the steps of: providing a composite material comprising a substrate and catalyst particles; and contacting a fluid stream with said composite, wherein said composite adsorbs and/or oxidizes said mercury.
2. The method of Claim 1, wherein said catalyst particles are on the substrate surface and/or contained in the substrate.
3. The method of Claim 1, wherein said composite material is a sorbent.
4. The method of Claim 3, wherein said sorbent is a gel.
5. The method of Claim 4, wherein said gel is a xerogel.
6. The method of Claim 1, further comprising the step of irradiating said composite material with radiation.
7. The method of Claim 6, wherein said radiation has a wavelength of from about 160 to about 680 nm.
8. The method of Claim 1, wherein said substrate is transparent to radiation.
9. The method of Claim 8, wherein said substrate comprises porous silica.

10. The method of Claim 9, wherein said catalyst comprises  $\text{TiO}_2$ .
11. The method of Claim 3, wherein said sorbent has a surface area (BET) of about 1 to about  $1500 \text{ m}^2/\text{g}$ .
12. The method of Claim 1, wherein said catalyst is present in said composite material in an amount of from about 0.1 to about 100 wt%.
13. The method of Claim 1, further comprising the step of regenerating the composite.
14. The method of Claim 13, wherein said regeneration step comprises chemical or thermal regeneration.
15. A composite, comprising a sorbent and mercuric oxide.
16. The composite of Claim 15, further comprising a catalyst.
17. The composite of Claim 16, wherein said catalyst is present in said composite in an amount of about 0.1 to about 100 wt%.
18. The composite of Claim 16, wherein said catalyst is a photocatalyst.

19. The composite of Claim 18, wherein said photocatalyst is  $\text{TiO}_2$ .
20. The composite of Claim 15, wherein said sorbent is a gel.
21. The composite of Claim 20, wherein said gel is a xerogel.
22. The composite of Claim 15, wherein said sorbent is silica.
23. The composite of Claim 15, wherein said sorbent has a surface area (BET) of from about 1 to about  $1500 \text{ m}^2/\text{g}$ .
24. The composite of Claim 15, wherein said mercuric oxide is present in said composite in an amount of from about 0.1 to about 100 wt% .